

ABSTRACT

A controller for an electromagnetic actuator comprises a pair of springs acting on opposite directions, and an armature connected to the springs. The armature is held in a neutral position given by the springs when the armature is not activated. The actuator also comprises a pair of electromagnets for driving the armature between two end positions. In response to a release of the armature held in one of the end positions, the controller applies brake to the armature according to a load condition of the armature. In high-load conditions, the valve can surely be opened without additional electric power. In low-load conditions, the armature is prevented from colliding with a yoke of the electromagnet. The application of brake includes over-excitation operation, flywheel operation and suspension of power supply. In the over-excitation operation, voltage is applied to the electromagnet corresponding to one of the end positions from which the armature is released for a first period. The first period may be determined according to a load condition of the armature. After the first period elapses, flywheel current is supplied to the electromagnet for a second period. After the second period elapses, power supply to the electromagnet is suspended. Appropriate combination of over-excitation operation, flywheel operation and suspension of power supply allows the braking force to be adjusted according to a load condition of the armature.